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DANN, DORFMAN, HERRELL & SKILLMAN
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EXAMINER

FETZNER, TIFFANY A

ART UNIT	PAPER NUMBER
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2859

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06/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/520,862

Applicant(s)

CALLAGHAN ET AL.

Examiner

Tiffany A. Fetzner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/21/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/21/2005 & 8/1/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 8/01/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statement. The initialed and dated IDS, is attached to this office action.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-8, 10-20, 22, and 25** are rejected under **35 U.S.C. 102(b)** as being anticipated by **Yamaguchi et al.**, US Patent **4,931,760** issued **June 5th 1990**.
5. With respect to **Claim 1**, **Yamaguchi et al.**, teaches and shows "A magnetic assembly for an NMR apparatus" [See figures 1, 2, 10 and 12 through 14c; the abstract, and col. 3 line 36 through col. 14 line 35.], "comprising a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter "longitudinal axis")" [See component 2 with col. 3 line 37 through col. 14 line 35; the abstract, and figures 1, 2, 10 and 12 through 14c], "the arrangement and/or characteristics of the plurality of magnets being such so as to create a zone of homogeneous magnetic field at some location along the axis forward of the array (and into the material when provided)" [See the

detailed explanations concerning the generated magnetic field from col. 1 line 12 through col 14 line 35 concerning the homogeneous magnetic field produced.].

6. With respect to **Claim 2, Yamaguchi et al.**, teaches and shows "a secondary permanent magnet located along the longitudinal axis, at least partly within the array of primary magnets". " [See component 4 with col. 3 line 37 through col. 14 line 35; the abstract, and figures 1, 2, 10 and 12 through 14c], " The same reasons for rejection, which apply to **claim 1**, also apply to **claim 2** and need not be reiterated.

7. With respect to **Claim 3, Yamaguchi et al.**, teaches and shows " wherein the position of the secondary permanent magnet is adjustable along the longitudinal axis relative to the primary magnets. [See col. 2 line 35 through col. 14 line 35 with respect to the numerous combinations of ways in which the magnetic components and blocks may be moved relative to one another. Additionally, see figures 1 through 14c]. The same reasons for rejection, which apply to **claims 1, 2** also apply to **claim 3** and need not be reiterated.

8. With respect to **Claim 4, Yamaguchi et al.**, teaches and shows "the secondary magnet is a cylindrical" trapezoidal "bar magnet" which may also have any desired polygonal shape. [See col. 2 line 37 through col. 14 line 35 with respect to the numerous combinations and shapes which may comprise the structure of the permanent magnetic components. Additionally, see figures 1 through 14c]. The same reasons for rejection, which apply to **claims 1, 2, 3** also apply to **claim 4** and need not be reiterated.

9. With respect to **Claim 5, Yamaguchi et al.**, teaches from the mathematical calculations provided and shows from the figures 1 through 14c taken in combination with one another that "the secondary magnet is positioned such that the first and second spatial derivatives of the magnetic field are zero at some coincident location along the longitudinal axis forward of the array (and into the material when provided). The same reasons for rejection, which apply to **claims 1, 2, 3** also apply to **claim 5** and need not be reiterated.

10. With respect to **Claim 6, Yamaguchi et al.**, teaches and shows, from figures 1, 3a-3d, and 11; along with the teachings of col. 2 line 37 through col. 14 line 35 that "

each of the primary magnets has a north and a south pole with an axis extending there between, and the primary magnets are arranged such that their axes are oriented at a non-parallel angle to the longitudinal axis of the assembly." The same reasons for rejection, which apply to **claim 1** also apply to **claim 6** and need not be reiterated.

11. With respect to **Claim 7, Yamaguchi et al.**, teaches and shows that "each of the plurality of primary magnets is a cylindrical" trapezoidal "bar magnet, each having a proximal end at a front of the array, and a distal end at a rear of the array." [See figures 1, 10; and col. 2 line 37 through col. 14 line 35 with respect to the shapes and locations of the various combinations of the magnet components.] The same reasons for rejection, which apply to **claims 1, 6** also apply to **claim 7** and need not be reiterated.

12. With respect to **Claim 8, Yamaguchi et al.**, shows from figures 1 and 10 that "each of the plurality of primary magnets is tilted at an angle relative to the longitudinal axis, such that the configuration of magnets is in a substantially symmetrical tapered arrangement." The same reasons for rejection, which apply to **claims 1, 6, 7** also apply to **claim 7** and need not be reiterated.

13. With respect to **Claim 10, Yamaguchi et al.**, shows that "A magnetic assembly as claimed claim 8 or 9, wherein the proximal end of each of the plurality of primary magnets is tilted through an angle beta towards the longitudinal axis, such that the configuration of primary magnets is in a substantially symmetrical tapered arrangement, tapering towards the front of the array" [See figures 1, 11]. The same reasons for rejection, which apply to **claims 1, 6, 7, or 8** also apply to **claim 10** and need not be reiterated.

14. With respect to **Claim 11, Yamaguchi et al.**, teaches "A magnetic assembly as claimed in claim 8 or 9, wherein the proximal end of each of the plurality of primary magnets is tilted through an angle beta away from the longitudinal axis, such that the configuration of primary magnets is in a substantially symmetrical tapered arrangement, tapering away from the front of the array". [See col. 2 line 37 through col. 14 line 35 with respect to the shapes, tapering, and locations of the various combinations of the magnet components. The **Yamaguchi et al.**, invention is not limited by the figures, all of the combinations taught in the text are also possible within the scope of the **Yamaguchi**

et al., invention.] The same reasons for rejection, which apply to **claims 1, 6, 7, or 8** also apply to **claim 11** and need not be reiterated.

15. With respect to **Claim 12, Yamaguchi et al.**, shows that “the plurality of primary magnets is disposed substantially symmetrically about the longitudinal axis.” [See figures 1, 2, 10, and the text of col. 2 line 37 through col. 14 line 35 with respect to the shapes, tapering, and locations of the various combinations of the magnet components.] The same reasons for rejection, which apply to **claim 1** also apply to **claim 12** and need not be reiterated.

16. With respect to **Claim 13, Yamaguchi et al.**, shows from figure 1 that “the primary magnets are as close together as is physically or reasonably possible”. The same reasons for rejection, which apply to **claim 1** also apply to **claim 13** and need not be reiterated.

17. With respect to **Claim 14, Yamaguchi et al.**, shows from figure 1 that “each of the plurality of primary magnets is substantially identical”. The same reasons for rejection, which apply to **claim 1** also apply to **claim 14** and need not be reiterated.

18. With respect to **Claim 15, Yamaguchi et al.**, teaches and shows that “a secondary permanent magnet located along the longitudinal axis, at least partly within the array of primary magnets, wherein the secondary magnet is of substantially identical dimensions to each of the plurality of primary magnets. [See figures 1, through 14c, and the text of col. 2 line 37 through col. 14 line 35 with respect to the shapes, tapering, dimensions and locations of the various combinations of the magnet components.] The same reasons for rejection, which apply to **claims 1, 14** also apply to **claim 15** and need not be reiterated.

19. With respect to **Claim 16, Yamaguchi et al.**, teaches and shows “each of the plurality of primary magnets and the secondary magnet is a cylindrical” trapezoidal “bar magnet having a radius of about 1.8 cm and a length of about 5 cm.” [See figures 1, 10, 2, and the dimensions of col. 12 line 54 through col. 13 line 3.] The same reasons for rejection, which apply to **claims 1, 14, 15** also apply to **claim 16** and need not be reiterated.

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20. With respect to **Claim 17, Yamaguchi et al.**, shows from figure 10 “eight primary magnets” The same reasons for rejection, which apply to **claim 1** also apply to **claim 17** and need not be reiterated.

21. With respect to **Claim 18, Yamaguchi et al.**, teaches and shows “A magnetic assembly for an NMR apparatus, comprising a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter "longitudinal axis"), wherein each of the primary magnets has a north and a south pole with an axis extending there between, and the primary magnets are arranged such that their axes are oriented at a non-parallel angle to the longitudinal axis of the assembly so as to create a zone of homogeneous magnetic field at some location along the longitudinal axis forward of the array (and into a material when provided). [See col. 2 line 37 through col. 14 line 35 with respect to the numerous combinations and shapes, which may comprise the structure of the permanent magnetic components. Additionally, see figures 1 through 14c].

22. With respect to **Claim 19, Yamaguchi et al.**, teaches and shows “A magnetic assembly for an NMR apparatus, comprising a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter "longitudinal axis"), and a secondary permanent magnet located along the longitudinal axis, at least partly within the array of primary magnets, so as to create a zone of homogeneous magnetic field at some location along the longitudinal axis forward of the array (and into a material when provided). [See col. 2 line 37 through col. 14 line 35 with respect to the numerous combinations and shapes, which may comprise the structure of the permanent magnetic components. Additionally, see figures 1 through 14c].

23. With respect to **Claim 20, Yamaguchi et al.**, shows from figure 14A, “A nuclear magnetic resonance apparatus for one sided access investigations of a material”, because in figure 14a entry into the homogeneous volume is from a single side. [See figure 14a, col. 12 lines 21-52] The same reasons for rejection, which apply to **claim 1** also apply to **claim 20** and need not be reiterated.

24. With respect to **Claim 22, Yamaguchi et al.**, teaches that the “A nuclear magnetic resonance apparatus as claimed in claim 20”, is “operable to provide investigations into a sample at up to about 10 cm. because the eight permanent magnet

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bricks which make up the exemplary embodiment of **Yamaguchi et al.**, each have dimensions of 20mm x 30mm x 50mm or 2cm x 3cm x 5cm. Using 8 annularly arranged trapezoidal shaped bricks to define a spherical region results in the diameter of the spherical region being at least 10cm or 100mm., because the diameter of the annular ring, defined by the bricks is, by geometry, at least twice the longest dimension. [See col. 12 lines 54-57.]

25. With respect to **Claim 25, Yamaguchi et al.**, teaches and shows "A nuclear magnetic resonance apparatus for one sided access investigations of a material", because in figure 14a entry into the homogeneous volume is from a single side. [See figure 14a, col. 12 lines 21-52] "comprising a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter "longitudinal axis"), and a secondary permanent magnet located along the longitudinal axis, at least partly within the array of primary magnets, the position of the secondary permanent magnet being adjustable along the longitudinal axis relative to the primary magnets, the arrangement and/or characteristics of the magnets being such so as to create a zone of homogeneous magnetic field at some location along the axis forward of the array (and into the material when provided)." [See the rejection reasons set forth in claim 1 which need not be reiterated. The same reasons for rejection, which apply to **claims 1, 20** also apply to **claim 25** and need not be reiterated.

26.

27. **Claims 1, 20, 21, and 26** are rejected under **35 U.S.C. 102(e)** as being anticipated by **Locatelli et al.**, US Patent **6,657,433 B1** issued **December 2nd 2003**, filed **June 15th 2000**.

28. With respect to **Claim 1, Locatelli et al.**, teaches and shows "A magnetic assembly for an NMR apparatus" [See figures 1, 2; the abstract, and col. 1 line 40 through col. 3 line 31.], "comprising a plurality of primary permanent magnets disposed in an annular array about an axis (hereafter "longitudinal axis")" [See components 1 through 8 of figure 1], "the arrangement and/or characteristics of the plurality of magnets being such so as to create a zone of homogeneous magnetic field at some location along the axis forward of the array (and into the material when provided)" [See the

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detailed explanations concerning the generated magnetic field from col. 1 line 40 through col. 3 line 31 concerning the homogeneous magnetic field produced.].

29. With respect to **Claim 20, Locatelli et al.**, teaches "A nuclear magnetic resonance apparatus for one sided access investigations of a material". [See col. 3 lines 13-23] The same reasons for rejection, which apply to **claim 1** also apply to **claim 20** and need not be reiterated.

30. With respect to **Claim 21, Locatelli et al.**, teaches that "the nuclear magnetic resonance apparatus is portable." [See col. 1 lines 40-46] The same reasons for rejection, which apply to **claims 1, 20** also apply to **claim 21** and need not be reiterated.

31. With respect to **Claim 26, Locatelli et al.**, teaches "A method of studying the magnetic resonance of a material comprising the steps of: **a)** employing an NMR apparatus as claimed in **claim 20**; [See the rejection of claim 20 above.] "**b)** generating a sufficiently homogeneous magnetic field over a volume V_a located at a location along the longitudinal axis in the material thereby causing excitation of subject nuclei in the volume V_a " [See the abstract, col. 1 line 40 through col. 3 line 22]; "and **c)** detecting radio frequency emissions from the subject nuclei in the volume V_a " [See the abstract, col. 1 line 40 through col. 3 line 22]. The same reasons for rejection, which apply to **claims 1, 20** also apply to **claim 26** and need not be reiterated.

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

33. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

34. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

35. **Claims 9** is rejected under **35 U.S.C. 103(a)** as being unpatentable over **Yamaguchi et al.**, US Patent **4,931,760** issued **June 5th 1990**.

36. With respect to **Claim 9**, **Yamaguchi et al.**, lacks a direct **verbatim** recitation of applicant's mathematics for the tapered magnetic block arrangement, however **Yamaguchi et al.**, does recite the mathematics involved in forming tapered trapezoidal magnetic blocks, [See the mathematical explanations from col. 6 line 38 through col. 13 line 39.] Therefore, It would have been obvious to one of ordinary skill in the art at the time that the invention was made that the **Yamaguchi et al.**, reference does teach the same basic mathematical formation of applicant's equation of claim 9. The difference in notation, is an obvious variation since each individual is allowed to be his/her own lexicographer.

37. **Claims 23, 24, and 27** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Locatelli et al.**, US Patent **6,657,433 B1** issued **December 2nd 2003**, filed **June 15th 2000**.

38. With respect to **Claim 23**, **Locatelli et al.**, lacks directly teaching that the apparatus is operable in such a fashion as to allow excitation of one volume V_a of the material, being one of a plurality of volumes V_1 to V_n existing as slices along the longitudinal axis." However, **Locatelli et al.**, teaches that an induced magnetic cylinder of 15mm diameter and 12 mm long occupying 2cm^3 the center of which is 25mm from the output of the magnetic system is produced as an induced excitation for examination

of a subject, which corresponds to applicant's volume of excitation V_a . Because the device of **Locatelli et al.**, is portable and movable over a subject, It would have been obvious to one of ordinary skill in the art at the time that the invention was made that the volume V_a of the material", is represented as "being one of a plurality of volumes V_1 to V_n existing as slices along the longitudinal axis" which are capable of being produced by the **Locatelli et al.**, invention. The same reasons for rejection, which apply to **claims 1, 20** also apply to **claim 23** and need not be reiterated.

39. With respect to **Claim 24**, **Locatelli et al.**, lacks directly teaching that the apparatus is operable to, following excitation of V_a then allow excitation of a second volume V_b being one of the plurality of volumes V_1 to V_n substantially immediately after excitation of V_a ." However, as mentioned in the rejection of **claim 23**, the **Locatelli et al.**, invention is portable, therefore the ability to repeat the measurement at a different location is a utility as well as a suggested and implied ability of the **Locatelli et al.**, invention. Therefore, moving the device in order to allow excitation of a second slice, across the subject being examined would have been obvious to one of ordinary skill in the art at the time that the invention was made. The ability to repeat a process with the same apparatus at a subsequent location, is also not a novel, and non-obvious feature. It is a commonly used practice in the art area of MRI in order to obtain enough signals across a sample in order to enable the production of a tangible and useful result.

40. With respect to **Claim 27**, **Locatelli et al.**, lacks teaching that "subsequent to step c)", the step of "**d**) substantially immediately following excitation of volume V_a , causing excitation of subject nuclei in a volume V_b , wherein V_b is a volume differing from V_a only in its position along the longitudinal axis; and **e**) detecting radio frequency emissions from the subject nuclei in the volume V_b " However, the examiner notes that, **Locatelli et al.**, does suggest limitation d) for the same reasons as those provided in the rejection of claim 24 above. Additionally, limitation e) is taught by **Locatelli et al.**, for the same reasons as those already provided in the rejection of 26 above, therefore, It would have been obvious to one of ordinary skill in the art at the time that the invention was made that the **Locatelli et al.**, invention is capable of performing the method steps

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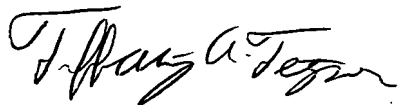
of **claim 27**. The same reasons for rejection, which apply to **claims 1, 20, 23, 24, 26** also apply to **claim 27** and need not be reiterated.

Conclusion

41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

42. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(571) 273-8300**.

43. Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TAF
June 11, 2007



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